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(54) Fluid dispenser

(57) A fluid-dispenser for a bulk container for potable liquids such as wine comprises a tubular filling and dispensing gland 42 welded around a hole in a laminated plastic bag 24, a sealing cylinder 56 having a diaphragm 58 at an oblique angle that seals its inner end and a tubular dispensing member 66 with a sharp cutting edge 74 at a corresponding oblique angle. When the fluid is to be dispensed, rotation of the dispensing member will cut around most of the periphery of the diaphragm to permit the fluid to enter the dispensing member. A tongue 34 which engages the container prevents unwanted rotation.

In a second embodiment the dispensing member is an unvalved rotatable tube (Fig. 7) with the cutting edge at one end and a hose or tubing connector at the second end for remote dispensing. In a third embodiment (Figs. 8—13) means (142) are provided for rotating the diaphragm cutting edge and also a double valving arrangement (166, 168, Fig. 9) and (162, 164, Fig. 11) that permits removal of the tap without loss of fluid from either the tap or from a flow of a partially filled fluid bag.

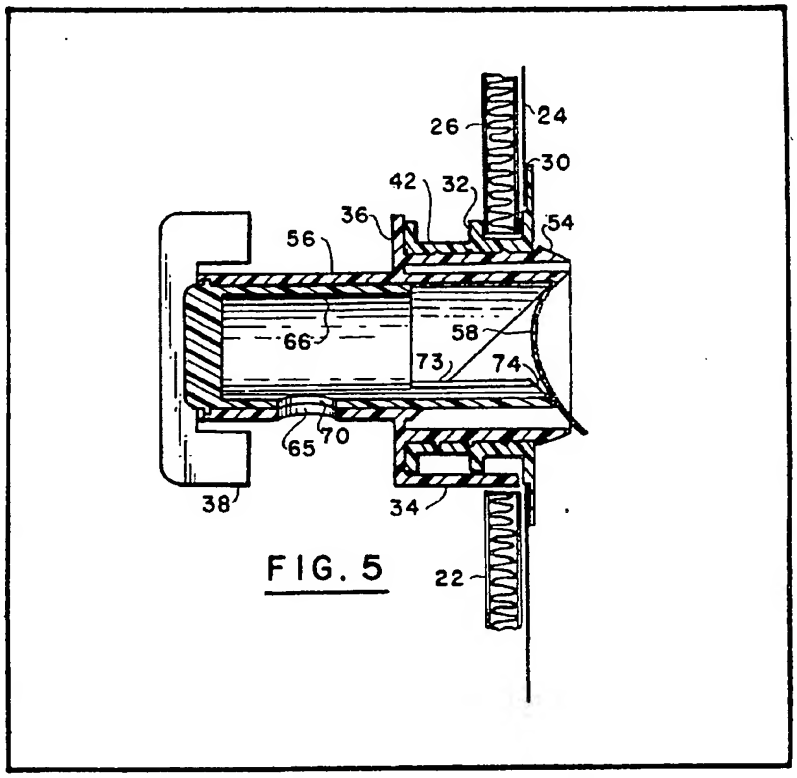

FIG. 5

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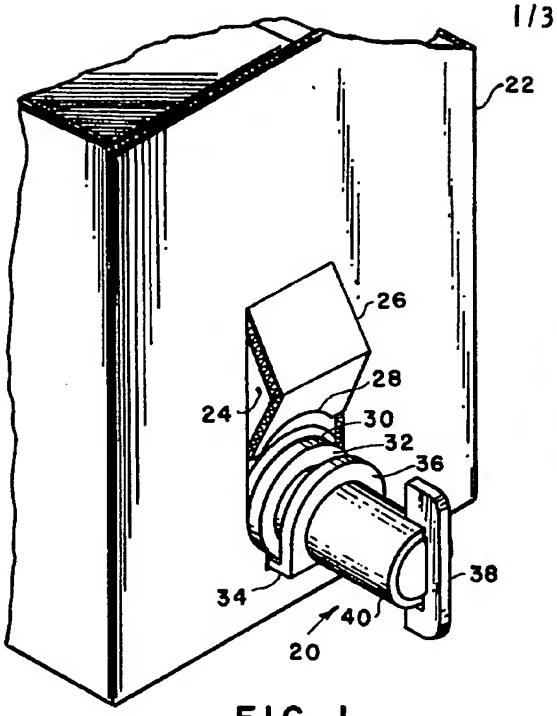


FIG. 1

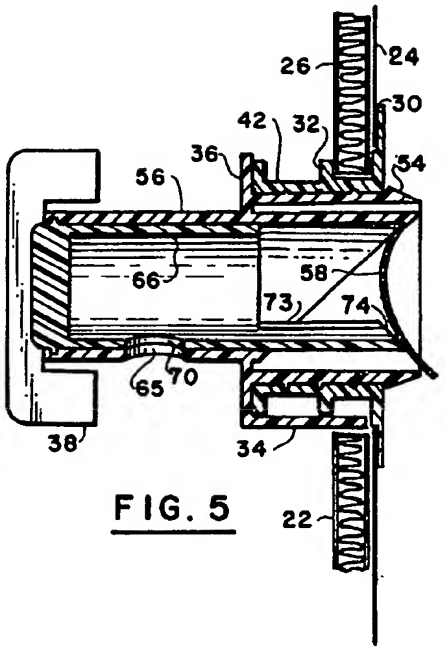
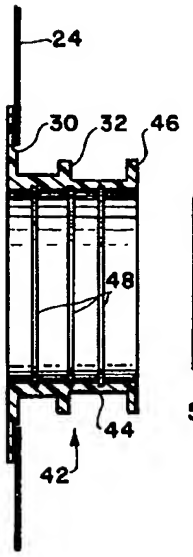


FIG. 5



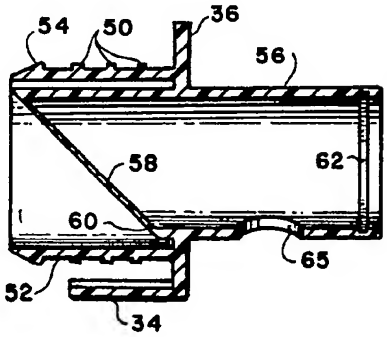


FIG. 3

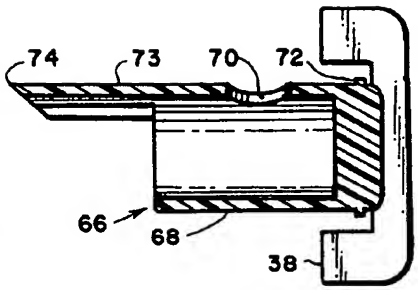


FIG. 4

FIG. 2

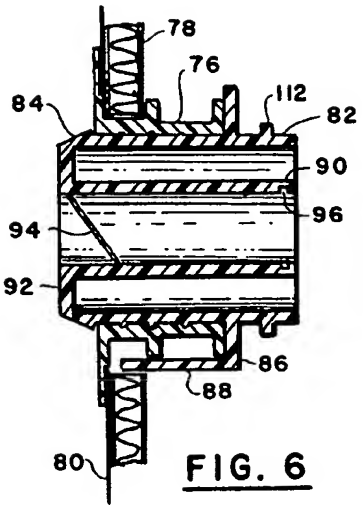


FIG. 6

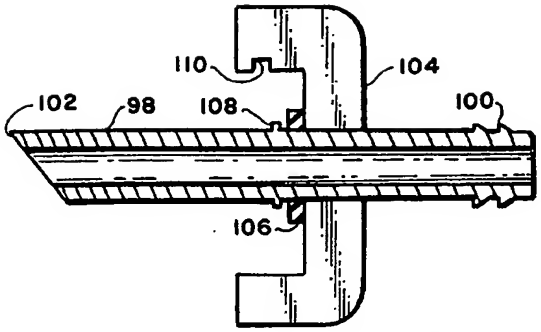
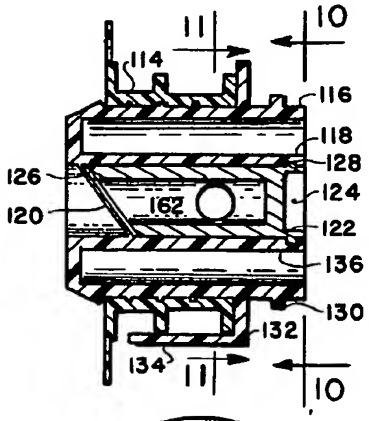


FIG. 7

FIG. 8



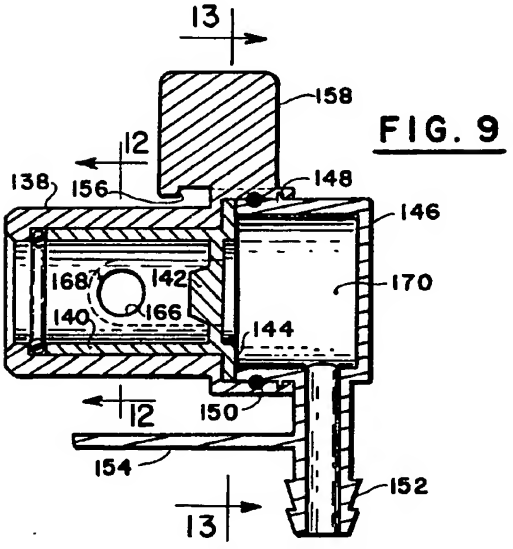


FIG. 9

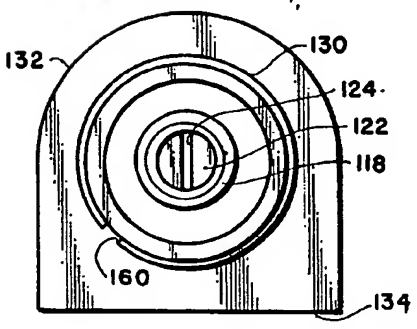


FIG. 10

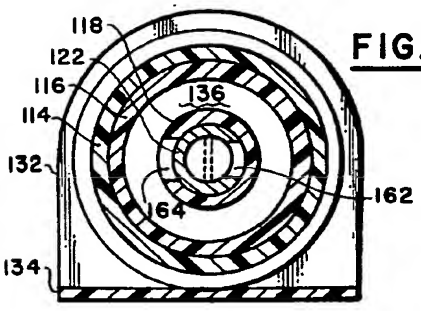


FIG. 11

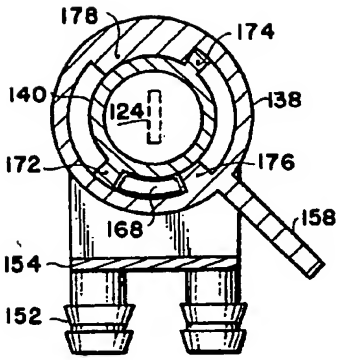


FIG. 13A

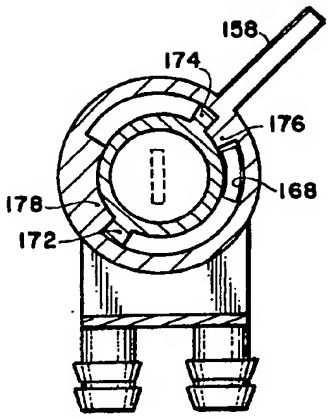


FIG. 13B

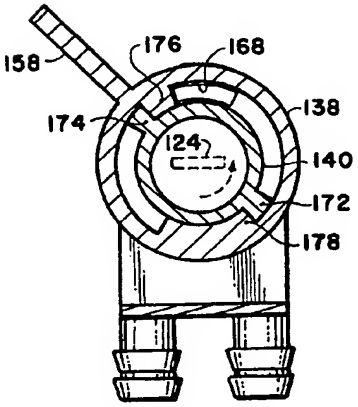


FIG. 13C

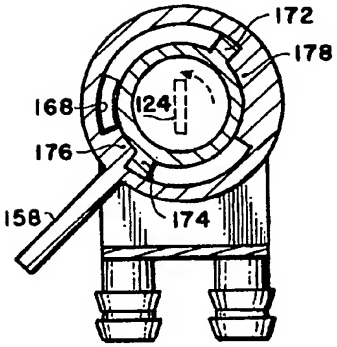


FIG. 13D

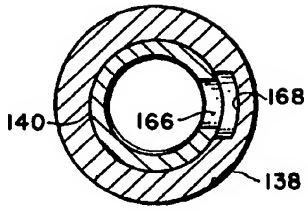


FIG. 12

SPECIFICATION
Fluid dispenser

This invention relates to bulk fluid containers and particularly to dispensers that also cut open sealed plastic, fluid-containing bags that are supported in rigid boxes or cartons.

Bulk containers of this type are especially valuable for the shipping, storage and dispensing of fluids that may become contaminated or otherwise deteriorated when exposed to an oxidizing atmosphere. In general, such a bulk container employs a dispenser having a flanged body that is attached to the outer surface of a bag made of a flexible plastic material that will not deleteriously affect the fluid or permit the seepage of external gases. The bag is filled, sealed and placed in an outer container of corrugated cardboard or the like. When ready for use, a dispenser tap or tube having a cutting edge is inserted into the flanged body to cut open the plastic bag and provide a dispenser for the fluid, as described in patent 4,355,737 to Pongrass et al. As the fluid is dispensed from the container, the flexible plastic bag correspondingly shrinks in volume without admitting air. Therefore, if the container is used for the storage and dispensing of oxygen-sensitive fluids such as wine, a partially filled container may be stored for long periods of time without danger of oxidation and souring.

All plastic fluid-containing bags must be open for filling and, to couple a bag to a filling nozzle, it is the current practice to weld a relatively rigid plastic gland to the bag during the manufacturing process. The bag itself is generally formed of two rectangular webs of plastic welded together along all four edges. Prior to the welding, a circular hole is cut in one of the webs and a flange on the gland is welded to the inner surface of the web, with the cylindrical gland extending through the hole to the exterior surface. After filling, the gland is sealed. If a bag-piercing dispenser is employed, such as that disclosed in the aforementioned patent, No. [U.S.] 4,355,737, the filling gland is usually sealed by heat welding the opposite web of the plastic bag to the inner opening of the gland. The present invention concerns the filling of the bag through the gland and then sealing the gland with a closure that has a piercable diaphragm. The diaphragm can then be pierced by a tap or tube to allow dispensing.

Briefly, the fluid-dispensing closure described and claimed herein operates with a plastic gland similar to that generally adopted by filling machine manufacturers. A sealing cylinder is inserted into the bore of the gland after the bag is filled to assure against fluid leakage from the bag or the possible ingression of contaminating gases. The interior of the sealing cylinder is sealed with an integral oblique plastic diaphragm molded across the inner bore. The diaphragm is relatively thick to assure against fluid and gas leakage but has a thinner frangible periphery that may be readily cut by rotation of a fluid-dispensing tap which fits within the bore of the sealing cylinder and which has an extension provided with a sharp cutting tip. Thus, the initial rotation of the dispensing tap will open the oblique sealing diaphragm in the bore of the sealing cylinder and will align radial holes in the dispensing tap and the sealing cylinder to permit the dispensing of the fluid. An important feature of the invention is that the diaphragm is not completely severed and cannot enter the dispensing tap to clog the radial dispensing holes.

A second embodiment employs a similar sealing cylinder with an oblique sealing diaphragm in the bore but, instead of a valved dispensing tap, employs an unvalved tubular member having an oblique cutting edge at its inner end and a tubing connector at the exterior end for conducting fluid from the bag to a remote dispensing location. A third embodiment permits a modified valved dispensing tap to be operated by a second removable valved dispenser so that full or partially filled fluid bag can be disconnected from the remote dispensing location without the loss of fluid or accidental admittance of exterior gases to the bag interior or the remote dispenser.

In the drawings which illustrate preferred embodiments of the invention:

Fig. 1 is partial perspective view illustrating the fluid-dispenser mounted to a carton containing the fluid-containing bag;

Fig. 2 is a sectional elevation view of the filling and dispensing gland;

Fig. 3 is a sectional elevation view of the sealing cylinder with oblique sealing diaphragm therein;

Fig. 4 is a sectional elevation view of a dispensing tap;

Fig. 5 is a sectional elevation view of an assembled fluid dispenser rotated to a position for dispensing fluid;

Fig. 6 is a sectional elevation view of an alternate embodiment of a sealing cylinder with oblique sealing diaphragm mounted within the filling and dispensing gland of Fig. 2;

Fig. 7 is a sectional elevation view of a tubular member with a diaphragm cutting inner end and a tubing connector outer end;

Fig. 8 is a sectional elevation view of the gland and sealing cylinder of Fig. 6 with a piercing element in position within the bore of the sealing cylinder;

Fig. 9 is a sectional elevation view of another embodiment illustrating a valved dispenser which may be removed from the sealing cylinder of Fig. 4 without the loss of fluid in the full or partially filled fluid bag;

Fig. 10 is an end view taken along the lines 10—10 of Fig. 8;

Fig. 11 is a sectional view taken along the lines 11—11 of Fig. 8;

Fig. 12 is a sectional view taken along the lines 12—12 of Fig. 9; and

Figs. 13A through 13D are sectional views taken along the lines 13—13 of Fig. 9 and illustrate the operation of the removable dispenser of Fig. 9.

Fig. 1 is a perspective drawing of the fluid dispenser 20 mounted in its operating position in a carton 22 which houses a flexible plastic bag 24 containing a fluid to be dispensed. During storage and shipping, the dispenser is stored within the carton and, when ready for use, is removed through an opening that is normally closed by a flap 26 in the carton. The dispenser is then connected to the carton opening by closing the arcuate end 28 of the flap 26 down and between annular flanges 30 and 32 on the outer surface of the dispenser. A flat horizontal tongue 34, parallel with the axis of the dispenser and formed on the lower part of an annular flange 36, mates with a corresponding flat surface cut in the bottom of the carton opening to thereby prevent rotation of the dispenser during its use. As will be subsequently described, after locking the dispenser 20 into its position to the carton opening, the dispenser handle 38 may be rotated one-half turn to partially cut open a diaphragm sealing the contents of the fluid bag from the dispensing tap 40 while simultaneously opening the fluid valve within the tap to dispense the fluid. Another one-half turn of the handle 38 to its original position will re-close the fluid valve within the dispenser 20. It will be noted that the diaphragm will remain partially attached to its original supporting member and therefore cannot enter the tap or interfere with the valving operations.

Figs. 2, 3 and 4 are sectional views of the three components that form the fluid dispenser 20 of Fig. 1. Fig. 2 illustrates the details of a filling and dispensing gland 42 which comprises a tubular plastic barrel 44 having a relatively wide annular inner flange 30 which is preferably welded to the inner surface of the fluid-containing bag 24. The tubular barrel 44 extends through a circular hole formed in the bag 24 during its assembly and, as previously mentioned, is of a conventional design employed by the manufacturers of filling machinery. As illustrated in Fig. 2, an annular flange 32 extends around the exterior surface of the gland 42 and is spaced from the flange 30 by an amount that generally corresponds to the thickness of the material of the carton 22. Spaced from the annular flange 32 and at the end of the tubular gland 42 that is opposite the flange 30, is a third flange 46.

The tubular interior bore of gland 42 may be provided with three or more annular grooves 48 which are adapted to mate with corresponding annular rings 50 on the internal surface of the sealing cylinder 52 of Fig. 3 to form a tight seal between the two members for preventing leakage of the fluid contained within the bag or the ingression of exterior gases into the bag.

Fig. 3 is a sectional elevation view of the sealing cylinder 52 which, when inserted into the bore of the gland 42 of Fig. 2 seals the opening in the fluid-containing bag 24. The exterior surface of the sealing cylinder 52 contains three or more annular rings 50 as mentioned above and, in addition, a tapered latch ring 54 which, as shown in Fig. 5, latches over the edge formed between flange 30 and the bore of the gland 42 to prevent removal of the sealing cylinder 52 once it has been inserted into the gland 42. As illustrated in Fig. 3 the external end of the sealing cylinder 52 terminates at the flange 36, the inner end of which is connected to the outer surface of a dispensing barrel 56. It will be noted that the flange 36 is only semi-annular as illustrated in Fig. 1 and the lower half of the flange 36 extends directly down to connect with the horizontal tongue 34 which, as illustrated in Figs. 1 and 5, mates with the flat surface at the bottom of the carton opening for preventing rotation of the dispenser.

The dispensing barrel 56 extends into the bore of the sealing cylinder 52 to a point approximately corresponding to the inner end of the sealing cylinder. The inner end of the dispensing barrel is cut at an angle of approximately 45° and is covered with a sealed diaphragm 58 of an impervious plastic material having a thickness of approximately 0.03 inches but which is reduced in thickness to approximately 0.01 inches at its peripheral intersection with the end of the dispensing barrel 56 to provide a frangible edge 60 which may be easily ruptured or cut by a sharp cutting edge. The oblique diaphragm 58 thereby forms a very effective seal to prevent the fluid from within the bag 24 from passing into the dispensing barrel 56.

The outer end of the dispensing barrel 56 opposite the oblique diaphragm 58 is provided with an interior annular groove 62. A dispensing hole 65 is cut through the bottom wall of the dispensing barrel 56. The annular groove 62 is designed to mate with an annular ring 72 in the exterior wall of the dispensing tap of Fig. 4 and the dispensing hole 65 in the dispensing barrel operates in conjunction with a similar dispensing hole 70 through the wall of the dispensing tap of Fig. 4 to form a fluid flow control valve.

Fig. 4 is a sectional elevation view of the dispensing tap 64 which comprises a tubular barrel 68 which is plugged at its outer end and supports thereon the dispenser handle 38. A dispensing hole 70 is cut through the top wall, as illustrated, of the tubular barrel 68 so that it may cooperate with the dispensing hole 65 in the barrel 56 of Fig. 3 when the dispensing tap 66 is rotated one-half turn. The dispensing tap is inserted into the bore of the dispensing barrel 56 of Fig. 3 and the annular ring 72 near the outer end of the tubular barrel 68 of Fig. 4 engages the annular groove 62 in the dispensing barrel 56 of Fig. 3. As illustrated, the top of the tubular barrel 68 has an extension 73 having a sharp cutting edge 74 at the end thereof. When the dispensing tap 66 is inserted into the bore of the dispensing barrel of Fig. 3, the cutting edge 74 of the barrel extension 73 does not quite contact the oblique diaphragm 58 at the inner end of the dispensing barrel. However, rotation of the dispensing tap 66 within the barrel 56 will cause the edge 74 to cut through the frangible rim 60 of the diaphragm 58 to thereby open the passageway into the fluid-

containing bag. When the dispensing tap has been rotated a full half turn so that the dispensing hole 70 in the tap 66 is aligned with the dispensing hole 65 of Fig. 3, the fluid will pass from the bag through both dispensing holes. Merely turning the handle 38 so that the two dispensing holes are no longer aligned, will shut off the flow of the fluid.

Fig. 5 is a sectional elevation view of the assembled dispenser including the gland 42, dispensing barrel 56 mounted to the sealing cylinder 52 and the dispensing tap 66 positioned within the bore of the dispensing barrel 56. Fig. 5 illustrates the dispensing hole 65 aligned with the hole 70 in the dispensing tap 66, or a one-half rotation of the tap 66 illustrated in Fig. 4. The rotation of the dispensing tap 66 causes the cutting edge 74 on the barrel extension 73 to cut through the frangible rim of the oblique diaphragm 58, thus forcing the diaphragm away from the end of the dispenser as illustrated. The attachment of the oblique diaphragm 58 to the extreme inner end of the dispensing barrel 56 remains intact so that the material of the diaphragm which is relatively thick cannot break into fragments that may enter the bore of the dispensing tap 66 and block the dispensing hole therein.

Fig. 6 is a sectional elevation view of a gland 76 mounted in the aperture of a carton 78 and having a flange welded to the interior peripheral surface of the fluid-containing bag 80. The gland 76 is identical to the gland 42 of Fig. 2 and supports in its bore a sealing cylinder 82 having a cylindrical outer surface similar to the sealing cylinder 52 of Fig. 3, with an annular latch ring 84 and annular rings engaging the annular grooves in the bore of the gland 76. The sealing cylinder 82 also includes a semi-annular ring 86, the lower end of which supports the horizontal tongue 88 which engages the horizontal slot in the carton 78 to prevent rotation of the sealing cylinder during operation.

As with the sealing cylinder of Fig. 3, sealing cylinder 82 of Fig. 6 supports a dispensing barrel 90 within its bore. Dispensing barrel 90 is coaxial with the sealing cylinder 82 and is supported by an annular wall portion 92 at the inner end of the sealing cylinder and connected to the annular latch ring 84. Orthogonally positioned within the bore of the barrel 90 and adjacent the inner end of the barrel, is rigid diaphragm 94 having a frangible peripheral edge similar to the diaphragm 58 of Fig. 3. An annular groove 96 is formed in the bore of the barrel 90 near the end opposite that supporting the diaphragm 94 to form a lock and moisture seal with the dispensing member of Fig. 7.

Fig. 7 is a sectional elevation view of a dispenser comprising a tubular member 98 having a flexible hose or tubing connector 100 at its outer end and an oblique sharpened cutting edge 102 at its inner end. A blade-type handle 104 is radially connected to the tubing member 98 and an annular resilient washer 106 on the tubular member 98 abuts against the inner side of the handle 104. An annular ring 108 in the periphery of the tubular member 98 is located to engage the annular groove 96 in the barrel 90 of Fig. 6 when the tubular member 98 is inserted into the bore of the dispensing barrel. When the ring 108 engages the groove 96, a rectangular slot 110 in the handle 104 will engage the annular ring 112 on the outer surface of the sealing cylinder 82 to prevent accidental removal of the tubular member 98 from the bore of the dispenser barrel 90.

The operation of the embodiment illustrated in Figs. 6 and 7 is similar to that of Fig. 5. The tubular member 98 is inserted into the bore of the dispenser barrel 90 to the point where the ring 108 on the tubular member engages the annular groove 96 in the barrel and where the slot 110 in the handle 104 engages the annular ring 112. The resilient washer 106 around the tubular member 98 abuts the outer end of the barrel 90 to act as a fluid seal in addition to that provided by the ring 108 and groove 96. Rotation of the handle 104 and tubular member 98 will cause the oblique cutting edge 102 to shear the frangible periphery of the oblique diaphragm 94 of Fig. 6 to thereby permit fluid from within the bag 80 to flow through the bore of the tubular member 98 and tubing connector 100 to a desired remote location. When the fluid in the bag 80 has been depleted, the tubular member 98 may be withdrawn from the bore of the dispensing barrel 90 for insertion in a new fluid-containing bag dispensing barrel.

Figs. 8 through 13 illustrate the details and operation of another embodiment of a fluid dispenser employing an oblique diaphragm with frangible periphery in the bore of a dispensing barrel within a sealing cylinder mounted within a conventional gland such as that described in Fig. 2. The advantage of this embodiment is that it includes a double valving system which permits the removal of the dispensing unit from the dispensing barrel without loss of fluid from a full or partially filled bag after the oblique diaphragm has been cut or the loss of the product inside the dispensing unit. As will be subsequently described, the dispenser handle may be rotated to lock the dispenser upon the sealing cylinder. The first half turn of the handle cuts open the oblique diaphragm in the bore of the dispensing barrel and opens the first valve in the barrel. A further quarter turn opens the second valve in the dispensing unit to permit the fluid to flow from the bag to the dispenser outlet. Reversing the rotation of the handle closes the first valve within the sealing cylinder and the second valve in the dispenser so that the dispenser may be removed from the sealing cylinder without loss of fluid from either the fluid bag or dispenser.

Fig. 8 is a sectional elevation view of the conventional filling and dispensing gland 114 having therein a sealing cylinder 116 which is identical to that illustrated in Fig. 6. The dispensing barrel 118 within the bore of the

sealing cylinder 116 supports the oblique mounted diaphragm 120 which forms a seal to the contents of the fluid-containing bag (not shown). Adjacent the diaphragm 120 is a tubular member 122 having a normally vertical diametric slot 124 on the substantially flat exterior and which is sealed from the bore of the member 122. The end of the member 122 opposite the slot 124 is at an oblique angle simliar to that of the oblique diaphragm 120 and includes a cutting edge 126 that is positioned so that rotation of the tubular member 122 will cut around the periphery of the oblique diaphragm 120 to open the seal into the fluid bag. The tubular member 122 is locked against longitudinal movement and is also sealed by the longitudinal ring and groove 128 adjacent the exterior edge of the dispensing barrel 118 and tubular member 122. As with the annular ring 112 of Fig. 6, the sealing cylinder 116 of Fig. 8 includes an annular ring 130 on the exterior surface of the sealing cylinder 116 and the semi-annular ring 132, the lower edge of which terminates in the horizontal tongue 134 that is inserted into the carton to prevent rotation. It will be noted that the bore of the sealing cylinder 116 is substantially greater than the outside diameter of the dispensing cup 136 which is adapted to receive the tubular body of the dispensing unit of Fig. 9.

The dispensing unit of Fig. 9 includes the tubular body 138 having an outside diameter corresponding to the inside diameter of the sealing cylinder 116. Rotatable within the bore of the tubular body 138 is a tubular sleeve 140 which is closed at its inner end and supports a normally vertical blade member 142 which is adapted to engage the diametric slot 124 in the tubular member 122 of Fig. 8. The closed inner end of the sleeve 140 terminates in a flange 144 which, as will be later described, are vertical tabs which cooperate with tabs in the circular body 138 to rotate the sleeve 140 as will be subsequently described in detail in connection with Figs. 13A—13D. Independently rotatable within the outer end of the tubular body 138 is a cup-shaped adapter 146 which is retained in the tubular body 138 by mating annular grooves and rings 148 and which is sealed against leakage by an O-ring 150. One or more tubular hose connectors 152 are connected to the lower end of the adapter 146 and support a horizontal tongue 154 that is positioned to contact with the lower surface of the tongue 134 in the sealing cylinder of Fig. 8. Thus, the tubular body 138 of Fig. 9 is designed to be inserted into the circular cup 136 in the sealing cylinder 116 of Fig. 8. When thus positioned, the blade member 142 will engage the diametric slot 124 and lip 156 in the lower inner surface of the handle or operator 158 will engage the annular ring 130 on the sealing cylinder 116.

It will be noted that the end elevation view of Fig. 10, which is taken along the lines 10—10 of Fig. 8, illustrates a small notch or opening 160 through the annular ring 130 and located approximately 45° below the horizontal plane. It will also be noted in Fig. 9 that the operator 158 is illustrated in a vertical position merely for illustrating the method of attachment to the exterior of the tubular body 138 and its relationship to the annular ring 130 of Fig. 8. The correct positioning of the operator 158 is illustrated in Figs. 13A through 13D.

Fig. 11 is a sectional elevation view taken along the lines 11—11 of Fig. 8 and illustrates the details of a first one of the double valves. As shown in Fig. 8, the tubular member 122 contains a radial aperture 162 which is also shown in Fig. 11. The dispensing barrel 118 also contains a radial aperture 164 located diametrically opposite and coaxial with the aperture 162. Thus, when the apertures 162 and 164 are not aligned as illustrated in Fig. 11, fluid which may enter the bore of the tubular member 122 from the fluid-containing bag is prevented from entering the circular cup 136 until such time there is alignment between the apertures 162 and 164. Appropriate rotation of the tubular member 122 in the dispensing barrel 118 provides the first valve that permits the removal of the dispenser of Fig. 9 while fluid remains within the fluid-containing bag.

The second valve is contained within the dispenser of Fig. 9 and comprises an aperture 166 through the wall of the sleeve 140 that may be aligned by rotation of the sleeve to coincide with a slot 168 longitudinally formed in the inner wall of the tubular body 138 as illustrated by the dashed lines of Fig. 9.

Fig. 12 is a sectional view taken along the lines 12—12 of Fig. 9 and illustrates alignment of the aperture 166 with the slot 168. When properly aligned, the fluid from the fluid-containing bag passes through the bore of the tubular member 122, through the apertures 162 and 164 of Fig. 11 and thence through the aperture 166 of Fig. 12 and into the slot 168 which is in open communication with a chamber 170 in the adapter 146 of Fig. 9. Fluid then may flow through the hose connector 152 for remote dispensing of the fluid. If desired, two or more hose connectors, such as the hose connector 152, may be connected to the chamber 170 for multiple dispensing or to operate as a manifold to couple a plurality of fluid-containing bags and associated dispensers to one common output tube. The multiple fluid container manifold arrangement is particularly useful inasmuch as each dispenser, such as the dispenser of Fig. 9, contains a valve which permits removal of the assembly from its associated fluid-containing bag without loss of fluid while still permitting the fluid from other sources to flow through the chamber 170 to an output tubing.

Figs. 13A through 13D illustrate the four principal positions of the tubular body 138 with respect to the sleeve 140 during the steps of cutting the oblique diaphragm 120 of Fig. 8 and the rotation of the various tubular members to provide the dual valving. Fig. 13A, taken along the

lines 13—13 of Fig. 9, illustrates the dispenser in position in the circular cup 136 of Fig. 8. The lip 156 on the handle or operator 158 passes through the opening 160 of Fig. 10 so that the lip engages the annular ring 130 around the periphery of the sealing cylinder 116 of Fig. 8. The operator 158 is at an angle of approximately 45° below a horizontal plane and the vertically aligned blade member 142 at the inner end of the sleeve 140 of Fig. 9 engages the vertically aligned slot 124 in the tubular member 122. The slot 124 is illustrated in Figs. 13A—13D as a dashed line to illustrate the appropriate degree of rotaton of the tubular member 122 of Fig. 8 to provide proper valving.

Initially, the valve provided by the radial apertures 162 and 164 of Fig. 11 is closed and the fluid slot 168 in the inner wall of the tubular body 138 is not aligned with the aperture 166 through the sleeve 140. Thus, both valves are closed while the dispenser of Fig. 9 is inserted into the circular cup 136 of the sealing cylinder 116 of Fig. 8. As shown in Fig. 13A, the flange 144 at the exterior closed end of the sleeve 140 of Fig. 9 is actually a pair of diametrically located tabs 172 and 174 which are adapted to cooperate with tabs 176 and 178 formed in the tubular body 138. The entire tubular body 138 is rotatable by the operator 158 and the tabs 174 and 176 operate to rotate the sleeve 140 within the body.

In Fig. 13B, the operator 158 has been rotated to a position approximately 45° above the horizontal so that the tabs 176 and 178 contact the sleeve tabs 174 and 172, respectively. There has been no rotation of the sleeve 140 but the slot 168 in the tubular body 138 has been aligned with the radial aperture 166 in the sleeve wall to thereby open one of the two valves in the system to the position shown in Fig. 12.

Fig. 13C illustrates another quarter turn rotation of the tubular body 138. The tabs 176 and 178 have now forced a quarter turn of the sleeve 140 and, as shown by the dashed outline, the diametric slot 124 in the end of the tubular member 122 of Fig. 8 has been rotated a quarter turn so that the cutting edge 126 will sever a portion of the periphery of the diaphragm 120. The valve formed by the apertures 162 and 164 of Fig. 11 has not yet been opened.

Fig. 13D illustrates the final position. The tubular body 138 has been rotated a third quarter turn and its tabs 176 and 178 have rotated the sleeve 140 a second quarter turn. As shown by the dashed line, the slot 124 in the tubular member 122 has now been rotated and the cutting edge 124 has cut a full half of diaphragm 120 of Fig. 8. The valve formed by the slot 168 and aperture 166 of Fig. 12 remains open and the apertures 162 and 164 of Fig. 11 are aligned to admit fluid through the bore of the tubular member 124, through the aperture 164 and the aperture 166 in the dispenser and into the slot 168 to the positon as indicated in Fig. 12. The fluid is now free to flow from the fluid bag container and from the slot 168 into the chamber 170 of Fig. 9 and through the appropriate hose connector 152.

To close the dual valves of the dispenser it is only necessary to reverse the rotation of the operator 158. The first quarter turn misaligns the slot 168 with the aperture 166 in the sleeve 140, thus closing the valve within the dispenser itself. The second quarter turn to the position illustrated in Fig. 13B causes the tab 172 on the tubular body 138 to contact tab 174 on the sleeve 140 and a further one-quarter turn to the position illustrated in Fig. 13A rotates the diametric slot 124 to the position illustrated in Fig. 13C to thereby close the inner valve comprising the apertures 162 and 164 of Fig. 11. The dispenser assembly of Fig. 9 may now be withdrawn from the sealing cylinder 116 of Fig. 8 without loss of fluid from either the dispenser of Fig. 9 or from the fluid-containing bag. It will be noted that the oblique diaphragm 120 of Fig. 8 has been cut and fluid may flow into the bore of the tubular member 122 but is prevented from flowing through the valve formed by the apertures 162 and 164 illustrated in Fig. 11.

It is noted that all embodiments shown and described herein employ a standard conventional gland. The gland, welded to the fluid-containing bag, contains at its bore a sealing cylinder having an oblique diaphragm which is servered around a portion of its periphery by the rotation of a cutting member within the bore of the sealing cylinder. In the first embodient, a conventional dispensing tap with an oblique cutting member at its inner end may be inserted into the barrel within the sealing cylinder so that rotation of the tap handle will sever the oblique diaphragm and provide a suitable valve for the dispensing of fluid.

In the second embodiment, a tube having a hose connection at one end and an oblique cutting edge at the inner end is inserted into the dispensing barrel of the sealing cylinder so that rotation of the tubular member will sever the periphery of the oblique diaphragm to permit the flow of fluid through the tube and into a remote dispensing tubing.

The third embodiment employs an identical sealing cylinder with a dispensing barrel containing the oblique diaphragm seal and also supporting a tubular member having an inner cutting edge and an outer end containing a socket which is rotated by a suitable handle to sever the periphery of the oblique diaphragm. In this embodiment the rotation of the cutting tubular member provides a first valving means within the sealing cylinder and also a second valving means in the dispensing unit so that the dispensing unit may be withdrawn without loss of any fluid.

Claims

1. In combination with a flexible fluid-containing bag for the bulk storage and dispensing of the fluid, a fluid dispenser comprising:

a cylindrical gland having an end flange

attached to the surface of the fluid-containing bag, the bore of said gland being in open communication with the inside of said bag;

a sealing cylinder inserted into the bore of said gland, said sealing cylinder having in its bore a diaphragm positioned at an oblique angle and sealing the bore of said sealing cylinder;

rotatable dispensing means mounted within the bore of said sealing cylinder and coaxial therewith, said dispensing means having an inner end angled to correspond to the oblique angle of said diaphragm and forming a cutting edge adjacent said diaphragm; and

means for rotating said dispensing means within said sealing cylinder whereby a portion of the periphery of said diaphragm is cut by said cutting edge to dispense said fluid through said dispensing means.

2. The fluid dispenser claimed in Claim 1 wherein the bore of said cylinderical gland and the exterior surface of said sealing cylinder have mating annular grooves and rings for providing a leak-preventing seal between said gland and said cylinder.

3. The fluid dispenser claimed in Claim 1 wherein said sealing cylinder includes an integral dispensing barrel coaxial with and within the bore of said sealing cylinder, said oblique mounted dipharagm being a part of said dispensing barrel, said rotatable dispensing means being mounted in the bore of said dispensing barrel.

4. The fluid dispenser claimed in Claim 3 wherein said cylindrical gland includes a second annular flange parallel with and spaced from said end flange by an amount substantially corresponding to the thickness of the material of a container that supports the flexible fluid-containing bag, whereby said gland may be inserted into a slot through the wall of said container.

5. The fluid dispenser claimed in Claim 4 wherein said sealing cylinder includes a peripheral annular ring supporting a flat horizontal tongue underlying the exterior surface of said cylindrical gland, said tongue being insertable into a mating slot in the wall of said container for preventing axial rotation of said gland and said sealing cylinder.

6. The fluid dispenser claimed in Claim 5 wherein said rotatable dispensing means is a tubular dispensing tap having a radial aperture alignable with a corresponding radial aperture in the wall of said dispensing barrel for dispensing fluid through said aligned holes upon rotation of said tap.

7. The fluid dispenser claimed in Claim 6 wherein the bore of said dispensing tap is closed at the end opposite its oblique angled cutting edge, said closed end supporting a handle for rotating said dispensing tap within the bore of said dispensing barrel.

8. The fluid dispenser claimed in Claim 5 wherein said rotatable dispensing means is a tubular member having a flexible tubing connector at the end opposite its oblique angled cutting edge, said tubular member having a handle between said tubing connector and said cutting edge for rotating said member and said cutting edge.

9. The fluid dispenser claimed in Claim 5 wherein said rotatable dispensing means is located within the bore of said dispensing barrel, the end of said dispensing means opposite its oblique cutting edge being closed and having in the exterior end thereof a diametric slot, the bore of said dispensing means having a radial hole through the wall, said radial hole being alignable with a second radial hole through the wall of said dispensing barrel for forming a first fluid valve between the bore of said dispensing means and a cavity formed between the exterior wall of said dispensing barrel and the coaxial interior wall of said sealing cylinder.

10. The fluid dispenser claimed in Caim 9 further including a fluid dispensing unit having a tubular body, a tubular sleeve rotatable within the bore of said tubular body and coaxial therewith, and a fluid chamber having at least one fluid output port, said chamber being in open communication with a conduit formed in the inner wall of said tubular body, the first end of said tubular body and said tubular sleeve being insertable into the cavity between said dispensing barrel and said sealing cylinder, said rotatable tubular sleeve being closed at its inner end and supporting a blade member for engaging said diametric slot in the closed end of said rotatable dispensing means, said rotatable tubular sleeve having a radial hole alignable with said tubular body conduit and alignable with the radial hole in said dispensing barrel for forming a fluid valve upon rotation of said rotatable tubular sleeve, said fluid-dispensing unit including an operator coupled to said tubular body for rotating said tubular body.

11. The fluid dispenser claimed in Claim 10 wherein said fluid chamber is tubular and coaxial with said tubular body and said tubular sleeve and is adjacent the second ends of said body and said sleeve, the output port of said chamber supporting a flat, horizontal, rotation-preventing tongue which, in operation, underlies the flat tongue on said sealing cylinder underlying the exterior surface of said gland.

12. The fluid dispenser claimed in Claim 11 wherein the end of said tubular body adjacent said fluid chamber supports at least one radial flange which, upon rotation of said body by said operator, cooperates with at least one radial flange on the end of said tubular sleeve to rotate said sleeve, said blade member on said sleeve, and said rotatable dispensing means to cut around the periphery of said fluid sealing diaphragm and to open and close said first and second fluid valves.

13. In combination with a fluid-containing flexible bag for the storage and dispensing of the fluid; a substantially rigid housing supporting said bag and a fluid-dispensing valve, said valve being

operated by rotation of a valve member around an axis substantially normal to a wall of said housing, said valve being coupled through an opening in said wall and in communication with said fluid, the improvement comprising:

a tongue, said tongue being substantially parallel with the rotational axis of said valve and inwardly supported by a non-rotatable housing member of said dispensing valve through a mating opening in said bag housing wall for preventing rotation of said non-rotatable valve housing member.

14. The improvement claimed in Claim 13 wherein said tongue is a substantially flat horizontal member supported beneath said non-rotatable valve housing member and insertable into a corresponding slot in said bag housing wall.

15. A fluid dispenser comprising:

a cylindrical gland having an end flange adapted for attachment to the surface of the fluid-containing bag, the bore of said gland being, in use, in open communication with the inside of said bag;

a sealing cylinder inserted into the bore of said gland, said sealing cylinder having in its bore a diaphragm positioned at an oblique angle and sealing the bore of said sealing cylinder;

rotatable dispensing means mounted within the bore of said sealing cylinder and coaxial therewith, said dispensing means having an inner end angled to correspond to the oblique angle of said diaphragm and forming a cutting edge adjacent said diaphragm; and

means for rotating said dispensing means within said sealing cylinder whereby a portion of the periphery of said diaphragm is cut by said cutting edge to dispense said fluid through said dispensing means.

16. A fluid dispenser substantially as hereinbefore described with reference to, and as illustrated in, the accompanying drawings.

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